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The Dynamics of Poverty

Why Some People Escape from Poverty and Others Don't

An African Case Study

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In urban areas of Côte d'Ivoire, human capital is the endowment that best explains welfare changes over time. In rural areas, physical capital — especially the amount of land and farm equipment owned — matters most.

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Summary findings

Empirical investigations of poverty in developing countries tend to focus on the incidence of poverty at a particular point in time. If the incidence of poverty increases, however, there is no information about how many new poor have joined the existing poor and how many people have escaped poverty.

Yet this distinction is of crucial policy importance. The chronically poor may need programs to enhance their human and physical capital endowments. Invalids and the very old may need permanent (targeted) transfers. The temporarily poor, on the other hand, may best be helped with programs that complement their own resources and help them "bridge" a difficult period.

Results from analyses of panel surveys show significant mobility into and out of poverty and reveal a dynamism of the poor that policy should stimulate. Understanding what separates chronic from temporary poverty requires knowing which characteristics differentiate those who escape poverty from those who don't.

In earlier work, Grootaert, Kanbur, and Oh found that region of residence and socioeconomic status were important factors. In this paper they investigate the role of other household characteristics, especially such asset endowments as human and physical capital, in the case of Côte d'Ivoire.

In urban areas of Côte d'Ivoire, human capital is the most important endowment explaining welfare changes over time. Households with well-educated members suffered less loss of welfare than other households. What seems to have mattered, though, is the skills learned through education, not the diplomas obtained. Diplomas may even have worked against some households in having oriented workers too much toward a formal labor market in a time when employment growth came almost entirely from small enterprises.

In rural areas, physical capital — especially the amount of land and farm equipment owned — mattered most. Smallholders were more likely to suffer welfare declines. Households with diversified sources of income managed better, especially if they had an important source of nonfarm income.

In both rural and urban areas, larger households suffered greater declines in welfare and households that got larger were unable to increase income enough to maintain their former welfare level.

Households whose heads worked in the public sector maintained welfare better than other households, a finding that confirms earlier observations. The results also suggest that government policies toward certain regions or types of household can outweigh the effects of household endownments.

Surprisingly, migrant non-Ivorian households tended to be better at preventing welfare losses than Ivorian households, while households headed by women did better than those headed by men (after controlling for differences in or changes in endowment).

The implications for policymakers? First, education is associated with higher welfare levels *and* helps people cope better with economic decline. Second, targeting the social safety net to larger households — possibly through the schools, to reach children — is justified in periods of decline. Third, smallholders might be targeted in rural areas, and ways found to encourage diversification of income there.

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THE DYNAMICS OF POVERTY: WHY SOME PEOPLE ESCAPE FROM POVERTY AND OTHERS DON'T
An African Case Study

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This paper is an output of Research Project "The Dynamics of Poverty: Why some People Escape Poverty and Others Don't - A Panel Analysis for Côte d'Ivoire (RPO 678-70).

THE DYNAMICS OF POVERTY:
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I. Introduction

Empirical investigations of poverty in developing countries have tended to focus on the incidence of poverty at a particular point in time. This is largely dictated by the available data source, usually a household income or expenditure survey, which provides a snapshot picture of household welfare and poverty (at most over a one-year reference period). Studies which have looked at changes in incidence and depth of poverty over time, compare most often two snapshots (e.g., Glewwe and Hall, 1992; Grootaert, 1993; Mukui, 1994; World Bank, 1995). In many cases, such studies have been able to discover important socio-economic or regional patterns in incidence of poverty and in changes over time, which have guided policy makers in designing and targeting poverty alleviation policies.

However, all such studies must beg the question whether the observed trends in poverty pertain to the same or different poor people. In other words, if poverty incidence is observed to increase, it is not known whether this is due to new poor having joined the existing poor, or whether it is the net outcome of a dynamic process whereby some people escape poverty and others--a larger number than the net increase--have become poor. Yet, this distinction is of crucial policy importance. The chronically poor may be in need of programs to enhance their endowments of human and physical capital, or, in the case of poverty due to disability or old age, be in need of permanently targeted transfers. In contrast, the temporarily poor may be best helped with programs which complement their own resources and help them to "bridge" the period that they are poor.

Making the distinction between chronic and temporary poor requires information on the duration of poverty. In practice, this needs to come from panel surveys, which follow the same households over time. Panel surveys exist in a number of developed countries but are rare in the developing world, especially in Africa. A recent study based on the U.S. Panel

Survey of Income and Program Participation found that of 18.8 million poor people in 1990, more than 5 million had moved out of poverty by 1991, while more than 6 million had become poor (Shea, 1995). Looking at a three-year panel for Pakistan, Alderman and Garcia (1993) found that very few households remained poor or non-poor for each of the three years. For Africa, Grootaert and Kanbur (1995) found that in Côte d'Ivoire, 30% to 45% of households improved their living standard from one year to the next, over the 1985-88 period when the Ivorian economy was in severe recession. A significant number of these households managed to escape poverty. For example, in 1987-88, the two years with the largest economic decline, 26.7% of households who started off as very poor improved their poverty class to either mid-poor or non-poor, and 19.3% of mid-poor households escaped poverty.

Such results indicate significant mobility, into and out of poverty, and reveal a dynamism among the poor which policy should stimulate. To do so, it is necessary to know what characteristics differentiate those who escape poverty from those who remain poor. Grootaert and Kanbur found that region of residence and socio-economic status were important factors, but they did not investigate the role of other household characteristics, especially asset endowments such as human and physical capital. The present paper aims to fill this void.

In the next section, we present the data source and methodology for the inquiry. Sections 3 & 4 contain the empirical results, respectively for urban and rural areas, and a concluding section presents some policy implications.

II. Data Source and Methodology

The data for this analysis come from the Côte d'Ivoire Living Standards Survey (CILSS) which was conducted annually from 1985 to 1988. Each year the survey covered a representative sample of 1,600 households, and collected detailed information on employment, income, expenditure, assets, basic needs and other socio-economic characteristics of the household. Over the four years, coverage and methodology of the data collection were held constant so that results are comparable over time (see Grootaert, 1986, for more details on the CILSS).

In addition, the survey design consisted of a rotating panel: each year 50% of households were replaced, and the other 50% were kept in the sample and revisited the next year. Thus, in principle, the survey yields three overlapping two-year panels of 800 households each (1985-86, 1986-87, 1987-88). In practice, the construction of the panels encountered a set of practical problems, mainly due to inadequacies in the household identification numbers, and the resulting panels contain about 700 households. Grootaert and Kanbur (1995) give details of the procedure to construct the panels and assess their representativeness. They conclude that the attrition of households in the construction of the panels does lead to a bias, in the direction of some overestimation of poverty incidence, but that the extent of attrition is not such that it invalidates the analysis of the panel data.

The years covered by the CILSS, 1985-88, are of particular importance in the recent economic history of Côte d'Ivoire. Throughout the eighties Côte d'Ivoire experienced an economic recession, due to the collapse of the world prices of coffee and cocoa--the country's two main export crops--in the late seventies, and due to unsustainable economic policies (see Demery, 1994, for an analysis). Within the decade, 1987-88 was one of the worst periods. GDP per capita fell by 5% in real terms, but private consumption fell by almost 17%, and the poverty rate rose from 35% to 46% (Grootaert, 1993). While previously, investment had absorbed much of falling income, in 1987-88 there appears to have been a change in expectations, whereby people ceased to view the economic recession as a temporary phenomenon and consequently had to adjust their consumption levels downward to match the perceived fall in permanent income. It is thus meaningful to focus on the 1987-88 period, and the CILSS panel which captures these years, to study the dynamics of poverty, and to investigate which households managed to buck the overall trend of immiserization and to escape poverty.

The model we propose to estimate for this purpose is derived directly from the standard household utility maximization model (see for example, Deaton and Muellbauer, 1980, for a formal derivation). It relies on household expenditure as a money metric measure of utility. Such measure needs to take into account welfare differences due to differences in household size and in relative prices, and where different time periods are involved, due to

changes in the absolute price level. Real household expenditure per capita meets these criteria, and was constructed by deflating total household expenditure by household size, by a regional price index and by the consumer price index (see Grootaert, 1993, for details).

Real household expenditure per capita can then serve as dependent variable in a model with exogenous household endowments and characteristics as explanatory variables.

$$\frac{E_i}{N_i} = f(A_i; R_i) \qquad (1)$$

where E_i = real expenditure of household i

N_i = number of members in household i

A_i = assets of household i

R_i = a set of characteristics which summarize the economic environment in which i operates.

Equation (1) is a reduced form of the various structural equations which express the income earning and consumption behavior of the household. Glewwe (1991) has estimated such a model on the CILSS data.

In the case of panel data, equation (1) needs to receive a time subscript and first differences can be taken (where Δ is the difference operator)

$$\Delta\left(\frac{E_i}{N_i}\right) = f(\Delta A_i) \qquad (2)$$

This is a fixed effects model, and the R_i variables disappear since for each household they are

constant over time.[1]

Equation (2) describes welfare changes as a function of changes in household endowments. This assumes that initial conditions do not matter, and in the case of household welfare, this is not a tenable assumption. In fact, households' response to a changing economic environment is very much a function of the level of endowment prior to the changes, and the then prevalent behavior with respect to income generation. For example, whether the head of household works in government or is a farmer will affect the household's flexibility to change the allocation of time use of household members. The amount of physical assets affects the degree to which income drops can be smoothened over time by borrowing or by selling assets. Initial conditions can easily be entered in the difference equation.

$$\Delta\left(\frac{E_i}{N_i}\right) = f(A_i, \Delta A_i; R_i) \qquad (3)$$

The results in the next two sections will show the estimation of equations (2) and (3). The dependent variable in these equations can take on any positive or negative value, and is bound from below only by the highest per capita expenditure figure in the survey results, since this determines the largest possible decline. Hence, equation (3) can be estimated by OLS methods.

Explanatory Variables

The main set of explanatory variables is the household's endowment of human and physical capital. The human capital of the household is embodied in its members and hence

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[1/] This need not be the case, since R_i includes e.g., location, and this can of course change over time. However, the CILSS panel did not trace households that moved, but replaced them with the new household in the same dwelling. These households are not part of the panel in this study.

their numbers, by age and sex group, are introduced as a first set of regressors.[2]

Education has been summarized in one variable, adding up all the years of education of all household members. This excludes children still in school. Even though in Côte d'Ivoire many children work part time, their education is not usually related to the level of earnings. Adding up education years over different people obviously involves some simplifying assumptions about the equal value of a year of education acquired in different schools, curricula, at different periods of time, etc. This simplification was inspired mostly by pragmatic considerations to keep the number of variables manageable.

It may be useful though to separate out the education of the head of household under the assumption that his/her education has a greater influence on the household's income and welfare level than that of other members. The head's years of education are of course included in the household's total education years, but we also included a separate variable to indicate whether he/she has a diploma. In urban areas, we distinguish elementary, secondary, and other advanced diplomas, but in rural areas the number of cases was insufficient to distinguish type of diploma. The labor market in Côte d'Ivoire, especially the formal segment, is characterized by credentialism (Grootaert, 1987), so that the presence of a head of household with a diploma can be an important factor in protecting the household's welfare level by providing access to formal sector high paying jobs. Lastly, age and age squared of the head of household capture work experience and the stage in the life cycle of the household.

Physical capital constitutes the second major component of the household's asset endowment. We have included in the regression information on three sets of productive assets: farm land, farm equipment and non-farm enterprises. These are three of the most important

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[2/] In the long run, household size is endogenous to the extent that the number of children is a choice variable. For a short-term analysis, however, household size and composition can be considered as given.

indicators of the household's potential to generate income through own account activities.[3] In the urban areas regression, the ownership of farm land was included as a dummy variable (due to the lack of variation in farm size) but for rural areas the number of hectares of farm land was used as regressor. Farm equipment was entered both as a count of the number of pieces of equipment and as a value (the correlation between those is actually quite low). For non-farm enterprises, the number of such enterprises in the household and their gross revenue were used as variables. Gross revenue is used as an indicator of business volume and a proxy for equipment value.

In addition to these productive assets, we included whether the household owns a house, and the number and value of durable goods. While these assets do not directly contribute to the generation of income, they may do so indirectly, both through their function of shelter and as collateral for borrowing. Consumer durables are also often sold when the household faces economic duress perceived as temporary, and re-bought in better times. They thus serve a function of income smoothing over time.

Labor markets in Côte d'Ivoire do not function perfectly and past analysis (e.g., Grootaert, 1987, 1990) has indicated that gender and nationality are potential sources of market segmentation and discrimination. We included these two characteristics of the head of household in the regression to control for such possible segmentation.

The region and socio-economic status of the household are included as sets of categorical variables. The panel analysis referred to earlier found that poverty trends were different according to these criteria and they must thus serve as control variables in the regressions.

Income composition variables were included as proxies for household's ability

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[3] A similar argument can be made for these assets as for household size regarding their exogeneity. In the long run, physical capital assets are endogenous because they reflect successive choices of saving and accumulation by the household. For short-term analysis though, the amount of such assets is largely given.

to respond to economic change. It could be argued that income composition variables are redundant given the presence of physical and human capital variables and given that earned income measures the returns to this capital. This argument would be valid if the income variables were included in absolute values. As shares, however, they add new information, since the same asset endowment can lead to different income composition due to unmeasured factors such as skill and entrepreneurship. A diversified income base helps reduce household vulnerability to shocks. The economic adjustment in Côte d'Ivoire during the 1980s has been characterized by major shifts in income sources--especially away from wage labor (due to declines in formal sector employment) towards self-employment income. People's ability to take advantage of this trend is a major determinant of their change in welfare, over and above what is captured by their asset endowment. We think that the income composition variables capture part of that ability, albeit imperfectly (but better than other variables in the CILSS data).

Finally, the first-difference variables include all human and physical capital variables (except for diplomas, where the changes were too few) and the income composition variables.

Tables 1A and 1B summarize the explanatory variables and show their means and standard deviations. In the case of "initial conditions" variables, the figures pertain to 1987, while the change variables were calculated by subtracting 1988 values from 1987 values. Mean per capita expenditure in urban areas is almost twice that in rural areas, but the relative change is less. On average, expenditure per capita fell about 15% in urban areas, against about 20% in rural areas. Human capital, at 19 years of education, is much higher in urban households than in rural areas, where it is a mere 6 years. Only 6% of rural heads of household have a diploma, against 41% of urban heads. Physical assets show different patterns across urban and rural areas, much as one would expect. Land and home ownership are more frequent in rural areas, and the value of farm equipment is higher. However, the number of non-farm businesses and their revenue is much higher in urban areas. Urban households own almost three times as many durable goods than rural households, and the value of those durables is about one fourth of a year's worth of expenditure in urban areas, but barely 7% in rural areas.

Among the change variables, the most noteworthy differences are in the years of education and in non-farm capital. Years of education rose in urban areas but fell in rural areas, in line with the overall deterioration of basic services observed for rural areas (Grootaert, 1994). These was a huge drop in the revenue from non-farm business in urban areas, exceeding in fact the drop in household expenditure, but in rural areas the average change was zero. Since total income in urban areas fell by even more, the share of non-farm income actually rose. In all likelihood, this reflects the drop in profitability of an average urban small enterprise due to the large number of entrants in the informal sector (as a result of both demographic pressure and the reduction of formal sector employment). The number of durable goods owned, and their value, also declined between 1987 and 1988 in urban areas, while in rural areas there was a small gain. One can hypothesize that some of the declines in urban areas were duress sales.

III. Welfare Changes in Urban Areas

Table 2 presents the estimation results of equations (2) and (3) for urban areas. The first column shows the change in welfare in function of only the 1987 level of expenditure per capita. This explains 42% of the variance of the change. The negative coefficient (-0.45) suggests that there is a strong tendency towards the mean: every 1000 CFAF more/less of per capita expenditure in 1987 is associated with a negative/positive change of 450 CFAF between 1987 and 1988. Thus, the higher per capita expenditure is, the more likely the household is to experience a drop in welfare in the following year, and the lower per capita expenditure is, the higher the likelihood is for a rise in welfare. This suggests that there are large transitory components in the expenditure of most households, and this is of course consistent with the high mobility into and out of poverty which was observed in earlier panel analyses.

Skeptical readers may suggest that these are not transitory expenditure components but measurement errors. Clearly, this possibility can never be ruled out entirely in the absence of an independent "true" data source. However, several arguments support the interpretation that what is observed in the CILSS are genuine welfare changes. First and foremost, the average declines in per capita expenditure between 1987 and 1988 were, as we have seen, 15% and 20%, respectively, in urban and rural areas. This corresponds quite closely

to the drop in private consumption registered in the national accounts, which were derived from a variety of data sources other than the CILSS.[4]

Second, if the transitory expenditure components were in fact measurement error, the regression results would imply that such errors tend to offset over a two-year period. Positive errors in one period would be associated with negative errors in the next period and vice versa. However, there is no reason to believe that a household with a tendency to over- or under-represent its expenditure would switch this tendency from one year to the next. Rather the opposite is likely to be the case. Survey experience has revealed that households have a tendency to repeat their answers over time and, if anything, to overlook change. This positive over-time correlation in answers reflects perhaps that in reality expenditures do display positive intertemporal correlation. A constant tendency to err is part of the fixed effects in the model and disappears in the first-differencing procedure.

Third, survey experience also suggests that reporting errors increase with the level of income or expenditure, and are thus larger for richer households. To the extent that such tendencies are constant over time, the first differencing procedure also eliminates them. Finally, there remains the possibility that there are genuine transitory expenditure components but that households do not accurately report them. However, the likely direction of such error would be to underestimate the magnitude of the change. Households who in the year of the survey have expenditures which exceed their usual level are likely to underreport the excedent. Vice versa, households who are having a bad year are likely to partly hide this by reporting higher than actual expenditure. This tendency to report usual rather than actual events has been observed in much survey work, especially in the area of expenditures (see e.g., Scott and Amenuvegbe, 1990). This would imply that the regression results underestimate actual welfare changes. If we accept the tendency to report the usual situation, then in the extreme case of a

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[4/] The CILSS data have been scrutinized quite carefully and compared to most other available data sources for Côte d'Ivoire. Correspondence has been found to be high (see Grootaert, 1993, for details). Also, the quality control of the CILSS field work was exceptional and many safeguards against measurement errors were built in (see Ainsworth and Munoz, 1986).

survey where this tendency was maximal, measurement error would offset transitory components completely and we would observe no change, i.e. the opposite of what the CILSS results indicate.

While we certainly think that the data do include a measurement error component, we think that the first differencing procedure has largely eliminated it, and survey experience does not support that households tend to flip-flop from year to year in the magnitude and direction of error. Thus we think that the results in Table 2 measure in the first place genuine changes in transitory welfare.

Of course, perhaps an even more convincing argument is whether economic and social characteristics are systematically related to the observed changes, and for this we turn to the rest of the results. If measurement error were to dominate, we would expect to find no or low association between measured change and economic and social characteristics and no significant increase in explanatory power of the regression from adding such variables. The results in Table 2 show that there are systematic patterns in the observed welfare changes. Adding the base-year variables increases corrected R^2 from 0.41 to 0.47, and adding the first difference variables further raises it to 0.60. This also suggests that both initial conditions and the pattern of changes in endowment affect changes in welfare.[5]

Among the human capital variables, both household composition and level and type of education are strong predictors of change in welfare. Larger families suffer larger welfare losses. Especially the presence of adult males contributes to declines in welfare. This indicates that the earnings potential of males is on average lower than the claim they make on household spending.

Years of education has a strong positive effect on welfare change. Each

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[5/] We also estimated the model without base-year expenditure per capita as regressor. This proved to be an inferior specification and the results are not shown here.

additional year of education in the household is associated with a 2000 CFAF increase in expenditure per capita. The implied elasticity is 0.8. The effect of diploma though goes the other way. We think that this reflects the rapid informalization of the Ivorian labor market--between 1980 and 1992, 60,000 modern sector jobs were lost, whilst informal sector employment rose from 430,000 to 1,090,000. In such an environment, the credentialism associated with the formal sector and thus the role of diplomas became much less important. Our results suggest that diplomas, especially post-secondary ones, are associated with welfare losses. People with such diplomas may be too oriented towards the modern sector and unable to cope successfully in the high-competition informal sector. The coefficient of age of head of household suggests that welfare losses increase with age, up to ages 61-63, but the coefficients are not precisely estimated.

Physical capital is a much less important determinant of welfare change than human capital. Only durable goods (both the number and their value) are positively related with changes in expenditure. This is of course after controlling for the level of expenditure per capita, and this may well confirm the role of durables in smoothening expenditure fluctuations over time. Among productive capital, only the coefficient of number of non-agricultural household enterprises approaches the 10% significance threshold. It is surprising that this variable did not perform better, given the undeniable importance of household enterprise income for the bulk of urban dwellers. We suspect that the problem is the lack of a good measure: neither the number of such enterprises nor the estimate of gross revenue may be the key factors in explaining the role of such businesses in coping with the economic crisis. Consistent with this, the income composition variables were all insignificant.

The region and socio-economic status variables are strong predictors of welfare changes. This confirms the tabular findings of Grootaert and Kanbur (1995). All other things equal, residents of interior cities suffered greater welfare declines than those in Abidjan, and households with a head working in the public sector were most protected.

The segmentation variables offer two surprising findings. After controlling for

all other factors, households with female heads did not fare worse than others, and being non-Ivorian was associated with welfare improvements. Since such households are migrants, the results may well indicate self-selection, because migrants need to display more adaptability in the face of changing economic circumstances.

Turning now to the first difference variables, the results largely confirm the conclusion from the initial-state variables. The prime factor explaining welfare changes is changes in household composition. Households who had, in 1988, an additional child in the household, suffered on average a loss in per capita expenditure of 31,910 CFAF, i.e., about 10%. An additional male or female adult led to welfare losses of, respectively 44,310 CFAF and 39,280 CFAF, i.e., 12-15%. The implication is that in the 1987-88 period of economic decline, households who experienced increases in size, were unable to increase their command over resources to compensate for this, resulting in net welfare losses.

Households where years of education increased showed gains in welfare, but the coefficient of the magnitude of this effect is not precisely estimated.

Of the physical asset variables, only the variables for changes in the number of durables and changes in their value have coefficients significantly different from zero. This is to some degree tautological since the measure of welfare -- per capita expenditure -- includes a service value of durables. The causality may well run the other way here: those households who did not experience income declines were able to purchase durables.

The last column of Table 2 shows the pure first-difference model (equation (2)). The pattern of significance is largely the same as in the full model. The only difference is that the coefficient of change in wage share is now significantly different from zero. The positive sign suggests that obtaining wage employment is a factor in increasing welfare levels in the face of overall economic decline. This would stand to reason, since wage jobs are largely in the modern sector. Jobs in this sector have become increasingly scarce in Côte d'Ivoire, but wage levels have not declined much in real terms, so that it is indeed a haven of income protection.

In summary, our results suggest that households who were more successful at raising their welfare levels and escaping poverty in urban areas were those who are well educated (but not necessarily with diplomas), with young heads of household, few children, and holding a wage job, preferably in the public sector. There factors can be expected to be associated with high welfare levels, but the results here indicate that they are also associated with gains in welfare in a climate of overall economic decline, which moreover was characterized by the greatest welfare losses befalling those with the highest initial levels. Welfare gains were also easier to achieve in Abidjan than in other cities, and households who became larger between 1987 and 1988 suffered larger than average declines.

IV. Welfare Changes in Rural Areas

The fit of model (3) for rural areas is slightly less good than for urban areas. Still, the initial level of expenditure explains 28% of the variance in the change in expenditure, and the full model explains a respectable 50% of the variance. The same tendency towards the mean is observed, with about the same magnitude as in urban areas.

Household composition is again, as in urban areas, the prime determinant of changes in expenditure. However, the coefficients are lower than for urban areas, indicating a weaker link between household size and composition and welfare change (this is true even after controlling for the fact that welfare changes in absolute value were less in rural than in urban areas). Nevertheless, looking at the full model, each adult male reduces per capita expenditure by 12,820 CFAF, more than twice as much as a child or female adult.

The relative importance of education and the stage in the life cycle are different in rural than in urban areas. The average level of education in rural areas is less than one third what it is in urban areas, and it makes a lesser contribution to explaining welfare changes than in urban areas. Looking at the initial-situation model (column 2), each additional year of education in the household is associated with an increase in per capita expenditure of 1550 CFAF, or 4.4%, but in the full model the coefficient is no longer significantly different from zero. There is, however, a strong life cycle effect present. Rural households with heads

younger than 45 years are more likely to experience welfare increases. The reasons for this may be that younger farmers are more adaptable and receptive to planting new crops when changing economic circumstances warrant it, and/or are able to provide additional labor supply to compensate for lower returns when prices fall.

Among physical capital, only the size of land holding is a significant variable. This confirms that smallholders are more vulnerable to economic decline. An additional hectare of land is associated with a 4.7% higher gain in welfare. Even though it is just below the 10% significance critical value, the coefficient of the number of farm implements suggests that these implements contribute to protecting the household from drops in expenditure. The positive correlation between durables and gains in welfare observed in urban areas, seems to be present also in rural areas but the correlation is not statistically significant.

Income diversification appears to play a role in protecting rural residents from welfare drops but the effects are small. The strongest effect comes from high shares of non-farm income, but a one-percentage-point higher share would only lead to a gain in expenditure of 740 CFAF (2%).

The recorded welfare changes between 1987 and 1988 have strong regional and socio-economic dimensions. All other things being equal, residents of West Forest suffered declines almost 50% higher than those of East Forest. Export crop farmers on the other hand had large gains. These results confirm the observations of Grootaert and Kanbur (1995) which were based on two-way tables.

A remarkable result is suggested by the segmentation variables: nationality is not an important determinant of change in welfare, but the gender of the head of household is. Female headed household, with otherwise the same characteristics as male headed households experienced positive gains of 33,430 CFAF. Given that the mean change was a decline of 35,217 CFAF, it means that female headed households were able on average, to maintain their level of living, after controlling for endowments and changes therein.

Many more of the first-difference variables turned out significant in the rural equation than in the urban equation. Changes in household size and composition again have the strongest impact on welfare changes. It is noteworthy that an increase in the number of children, female adults and elderly has about the same negative effect on welfare changes. The coefficient of male adults is not significant, in contrast to what was the case for the initial state variable. There is thus clearly a different effect from the initial household composition than from the changes which occur over time.

Those households who became home owners over the period were also strong gainers in expenditure level--no doubt both events are the result from underlying favorable changes in income or other receipts of funds.

Households who were able to acquire additional farm equipment also gained in welfare. Changes in income composition also played a role: a one percentage point increase in the share of non-farm income is associated with a 2.7% gain in welfare, and the same increase in the share of farm income yield a 2% gain. Finally, changes in the value of durables is also associated directly with welfare changes.

In summary, in rural areas, those households most likely to achieve a gain in welfare in conditions of economic decline were those with fewer members, heads younger than 45 years of age, with larger and better equipped farms, and with a non-farm source of income. We found that female headed households did better than male headed households in avoiding welfare losses, and export crop farmers did better than food crop farmers, after controlling for differences in levels of endowment and changes therein. Education played a smaller role in rural areas than in urban areas. However, as in urban areas, households who grew larger in size suffered larger welfare losses.

V. Conclusion

Analysis of household panel surveys has suggested that for many households poverty is a temporary condition. This is hopeful news for poverty alleviation because it implies that the total resources needed are less than what would be the case without such mobility. The challenge though is to target funds to the long-term poor and to design appropriate programs which complement the resources of the temporary poor. To do so, one needs to know their characteristics. This paper provided evidence that endowments of human and physical capital and changes in them help explain why a household can successfully escape poverty, in addition to its demographic and other socio-economic characteristics.

In the case of Côte d'Ivoire, we found that in urban areas human capital is the most important endowment to explain welfare changes over time. Households with well educated members experienced welfare increases or below average decreases in a two-year period when the average household recorded 15-20% welfare losses. What seems to have mattered though is the skills learned through education, and not any diplomas obtained. These formal expressions of achievement may have worked against some households in having oriented them too much towards a formal labor market in a time when employment growth came almost entirely from small enterprises.

In rural areas, physical capital, especially the amount of land and farm equipment mattered most. Smallholders were more prone to suffer welfare losses. Related to this were changes in income composition. Households with diversified sources of income managed better, especially if they had an important source of non-farm income.

In urban as well as rural areas, the size and composition of the household were key factors in affecting welfare changes. There were different effects from the size and composition at the onset of the period and from changes occurring during the period, but both effects reinforced one another. Larger households suffered larger welfare declines and those experiencing increases in size were not able to compensate sufficiently to maintain welfare levels.

The regression results also confirmed earlier observations that region of residence and socio-economic status of the household were important determinants of welfare change. For example, for equal levels of endowments and for equal changes, households whose head worked in the public sector maintained better their welfare levels than households working in other sectors. The relative magnitudes of the relevant regression coefficients suggest that government policies towards certain regions or types of households can outweigh the effects from household endowments.

We also found that nationality and gender of the head of household are relevant characteristics, but not in the direction generally expected. Migrant non-Ivorian households tended to be better at preventing welfare losses than Ivorian households, while households headed by women did better than those headed by men (after controlling for differences in levels and changes in endowments.)

Lastly, we addressed the question of measurement error in the data. Such errors are potentially more harmful to multivariate analysis of panel data than in the case of cross-sectional data, because a given amount of measurement error will usually be a larger percentage of the change recorded in the panel than of the base value. We concluded that in the case of the Côte d'Ivoire Living Standards Survey, observed welfare changes were likely to be genuine and to reflect transitory components in household expenditure. If the data were dominated by measurement error, the regression results would imply a pattern of error (tendency towards zero, change in sign from one year to the next) which is not consistent with what is normally experienced in household surveys.

Our results provide some suggestions for policy makers. First, education is not only associated with higher welfare levels, but it also helps people cope better with economic declines. Côte d'Ivoire has recently experienced falling enrollment levels reflecting in part doubts about the value of education by parents. While curricula may need revision, policy emphasis on education should continue. Second, targeting the social safety net to larger households is justified in periods of economic decline. Providing support targeted at children,

e.g. through school lunches or subsidized school uniforms, might be a sensible policy to enhance the welfare level of large households. Third, in rural areas, support can be targeted to smallholders who are more vulnerable to welfare losses in periods of overall economic decline. Diversification of income, through the promotion of non-farm sources of income would contribute to protecting smallholders.

Fourth, given that it is always difficult to find easily observable targeting indicators, our results suggest that age of the head of household and the number of durables owned by a household can usefully be part of a set of indicators. Households with older heads tend to be more vulnerable, although the age range over which this is the case is different in rural and urban areas. Households with many durables experienced smaller welfare losses or welfare increases. In contrast, it does not appear that in Côte d'Ivoire targeting by nationality or gender of the head of household is warranted.

Our results are weakest in clarifying the role of small enterprises in helping the household escape poverty. As said, in rural areas, such enterprises help to diversify income of farmers and this does protect households against welfare losses. In urban areas though, this is less clear, even though the evidence does indicate that income from such enterprises is the most important source of income for many poor. Part of the problem may be that the variables in the regression are not the best ones to capture the ways in which such enterprises help the household cope. More important than gross revenue or the number of pieces of equipment may be the nature of these enterprises, the extent to which they use family labor, etc. A more detailed investigation of these enterprises would be a useful venue for future research.

Table 1: Means and Standard Deviations of Variables

(A) URBAN Areas	Mean	Standard Deviation
Expenditure Variables		
- Total household expenditure, 1987 (1000 CFA)	1734.080	1573.300
- Per capita expenditure, 1987 (1000 CFA)	310.317	254.131
- Change of total hh exp, 1987-88 (1000 CFA)	-286.675	753.693
- Change of per capita exp, 1987-88 (1000 CFA)	-48.361	175.879
Human Capital		
- # of children in hh	3.314	2.780
- # of male adults in hh	1.406	1.236
- # of female adults in hh	1.522	1.023
- # of elderly in hh	0.178	0.474
- Age of head of hh	42.572	12.363
- Age of head of hh squared	1964.810	1201.580
- No diploma	0.589	0.493
- Elementary diploma	0.161	0.368
- Secondary diploma	0.058	0.235
- Other advanced diploma	0.192	0.394
- Total years of education of hh members	18.969	18.756
Physical Capital		
- House ownership (yes=1)	0.336	0.473
- Land ownership (yes=1)	0.169	0.376
- # of farm equipments	0.022	0.165
- Value of farm equipment (1000 CFA)	2.603	34.147
- Non-farming business (yes=1)	0.483	0.500
- Revenue of nonfarm business (1000 CFA)	1750.490	9436.840
- # of durable goods in hh	3.358	3.304
- Value of durable goods (1000 CFA)	423.567	1269.700
Region		
- Abidjan	0.417	0.494
- Other cities	0.583	0.494
Socio-Economic Status		
- Public sector worker	0.234	0.424
- Private sector worker	0.560	0.497
- Other	0.206	0.405
Segmentation Variables		
- Non-Ivorian	0.231	0.422
- Head's gender (female=1)	0.169	0.376
Income composition (%)		
- Share of wage income	38.137	41.553
- Share of farm income	7.249	20.276
- Share of nonfarm income	37.263	42.297
- Share of other income	17.351	25.266
Change Variables between 1987 and 88		
- Change of # of children in hh	0.028	1.352
- Change of # of male adults in hh	-0.025	0.766
- Change of # of female adults in hh	0.042	0.743
- Change of # of elderly in hh	-0.017	0.166
- Change of total years of education	0.181	8.982
- Change of house ownership	0.014	0.204
- Change of land ownership	0.014	0.242
- Change of # of farm equipments	-0.006	0.129
- Change of value of farm equipments (1000 CFA)	-1.436	33.671
- Change of # of nonfarm business	0.050	0.741
- Change of revenue of nonfarm bus (1000 CFA)	-366.372	8759.400
- Change of # of durable goods	-0.003	1.188
- Change of value of durable goods (1000 CFA)	-57.903	1021.290
- Change of share of wage income	0.388	28.014
- Change of share of farm income	-0.836	11.705
- Change of share of nonfarm income	1.748	25.915
- Change of share of other income	0.093	21.843

(B) RURAL Areas	Mean	Standard Deviation
Expenditure Variables		
- Total household expenditure, 1987 (1000 CFA)	980.560	668.146
- Per capita expenditure, 1987 (1000 CFA)	176.900	96.689
- Change of total hh exp, 1987-88 (1000 CFA)	-180.912	450.444
- Change of per capita exp, 1987-88 (1000 CFA)	-35.217	75.934
Human Capital		
- # of children in hh	3.484	3.233
- # of male adults in hh	1.117	0.821
- # of female adults in hh	1.569	1.269
- # of elderly in hh	0.455	0.760
- Age of head of hh	48.698	14.773
- Age of head of hh squared	2589.090	1517.330
- Diploma (yes=1)	0.065	0.246
- Total years of education of hh members	5.991	8.737
Physical Capital		
- House ownership (no=1)	0.138	0.345
- Land used (hectares)	6.452	6.376
- # of farm equipments	0.211	0.591
- Value of farm equipment (1000 CFA)	17.680	64.719
- Non-farming business (yes=1)	0.179	0.384
- Revenue of nonfarm business (1000 CFA)	178.496	913.500
- # of durable goods in hh	1.390	1.590
- Value of durable goods (1000 CFA)	70.053	207.133
Region		
- East Forest	0.328	0.470
- West Forest	0.226	0.419
- Savanahh	0.446	0.498
Socio-Economic Status		
- Export crop farmer	0.258	0.438
- Food crop farmer	0.569	0.496
- Other	0.173	0.379
Segmentation Variables		
- Non-Ivorian	0.123	0.329
- Head's gender (female=1)	0.070	0.256
Income composition (%)		
- Share of wage income	4.798	19.770
- Share of farm income	63.612	28.937
- Share of nonfarm income	7.809	21.386
- Share of other income	23.782	20.191
Change Variables between 1987 and 88		
- Change of # of children in hh	0.012	1.295
- Change of # of male adults in hh	-0.009	0.576
- Change of # of female adults in hh	-0.021	0.791
- Change of # of elderly in hh	0.015	0.347
- Change of total years of education	-0.144	4.814
- Change of house ownership	0.003	0.224
- Change of land used (hectares)	0.235	4.672
- Change of # of farm equipments	0.012	0.479
- Change of value of farm equipment (1000 CFA)	7.522	59.102
- Change of # of nonfarm business	-0.009	0.606
- Change of revenue of nonfarm bus (1000 CFA)	-0.428	1050.150
- Change of # of durable goods	0.067	0.907
- Change of value of durable goods (1000 CFA)	17.845	366.313
- Change of share of wage income	-0.950	13.012
- Change of share of farm income	4.021	21.216
- Change of share of nonfarm income	0.566	16.173
- Change of share of other income	-4.223	18.202

Table 2: Determinants of Welfare Changes in Urban Areas

URBAN Areas	Change of Per Capita Expenditure (1000 CFA)			
Intercept	90.13 (11.21)**	388.30 (98.33)**	403.68 (88.05)**	-46.61 (8.61)**
Base Condition				
- Per capita expenditure (1000 CFA)	-0.45 (2.8E-2)**	-0.60 (4.2E-2)**	-0.64 (3.8E-2)**	
Human Capital				
- # of children in hh		-10.77 (3.57)**	-11.85 (3.37)**	
- # of male adults in hh		-18.65 (8.74)**	-25.45 (9.29)**	
- # of female adults in hh		-3.75 (9.24)	-17.87 (8.95)**	
- # of elderly in hh		7.62 (22.61)	12.30 (20.30)	
- Age of head of hh		-7.24 (4.08)*	-5.77 (3.56)	
- Age of head of hh squared		5.9E-2 (4.4E-2)	4.5E-2 (0.04)	
- No diploma (omitted)				
- Elementary diploma		-32.57 (23.95)	-38.43 (21.33)*	
- Secondary diploma		6.30 (35.40)	9.44 (31.50)	
- Other advanced diploma		-57.07 (29.86)*	-53.80 (26.48)**	
- Total years of education of hh members		2.66 (0.77)**	1.99 (0.71)**	
Physical Capital				
- House ownership (yes=1)		-0.70 (19.05)	9.44 (18.61)	
- Land ownership (yes=1)		-26.15 (32.29)	-38.65 (32.08)	
- # of farm equipments		0.68 (51.00)	-78.69 (125.28)	
- Value of farm equipment (1000 CFA)		9.7E-2 (0.24)	1.59 (1.82)	
- Non-farming business (yes=1)		22.71 (22.67)	33.62 (22.08)	
- Revenue of nonfarm business (1000 CFA)		2.1E-4 (7.5E-4)	6.3E-4 (1.2E-3)	
- # of durable goods in hh		3.77 (3.22)	5.78 (3.07)*	
- Value of durable goods (1000 CFA)		1.1E-2(6.5E-3)*	4.1E-2 (8.7E-3)**	
Region				
- Abidjan (omitted)				
- Other cities		-63.07 (16.69)**	-57.98 (14.78)**	
Socio-Economic Status				
- Public sector worker (omitted)				
- Private sector worker		-19.45 (20.40)	-47.10 (18.00)**	
- Other		6.25 (32.91)	-27.04 (29.28)	
Segmentation Variables				
- Non-Ivorian		40.58 (20.00)**	54.74 (17.49)**	
- Head's gender (female=1)		-10.73 (22.74)	0.13 (21.12)	
Income composition (%)				
- Share of wage income		-2.4E-3 (0.40)	7.7E-2 (0.40)	
- Share of farm income		0.12 (0.67)	0.17 (0.69)	
- Share of nonfarm income		-0.37 (0.41)	-0.48 (0.42)	
- Share of other income (omitted)				
Change Variables between 1987 and 88				
- Change of # of children in hh			-31.91 (5.41)**	-35.33 (7.23)**
- Change of # of male adults in hh			-44.31 (13.53)**	-30.94 (16.62)*
- Change of # of female adults in hh			-39.28 (10.56)**	-51.76 (13.44)**
- Change of # of elderly in hh			-28.64 (38.42)	8.00 (51.56)
- Change of total years of education			1.67 (1.22)	0.34 (1.61)
- Change of house ownership			-3.77 (33.10)	7.8E-3 (42.84)
- Change of land ownership			-0.86 (29.92)	8.11 (37.85)
- Change of # of farm equipments			-56.47 (138.88)	17.27 (82.06)
- Change of value of farm equipment(1000 CFA)			1.51 (1.83)	0.12 (0.31)
- Change of # of nonfarm business			10.66 (10.50)	12.06 (13.31)
- Change of revenue of nonfarm bus(1000 CFA)			1.4E-3 (1.3E-3)	1.0E-3 (1.0E-3)
- Change of # of durable goods			18.15 (5.46)**	22.18 (7.21)**
- Change of value of durable goods(1000 CFA)			3.8E-2 (9.4E-3)**	1.8E-2(8.6E-3)**
- Change of share of wage income			0.56 (0.35)	0.65 (0.36)*
- Change of share of farm income			-0.32 (0.70)	0.31 (0.84)
- Change of share of nonfarm income			0.07 (0.37)	0.73 (0.44)
- Change of share of other income (omitted)				
Mean of dependent variable	-48.361	-48.915	-48.91	-48.830
# of cases	360	352	351	359
R^2 / adj-R^2	0.416/0.414	0.512 / 0.471	0.655 / 0.606	0.214 / 0.177
F value	254.809**	12.591**	13.570**	5.812**

Note: * Significant at 0.10 level. ** Significant at 0.05 level. Standard errors are in parentheses.

Table 3: Determinants of Welfare Changes in Rural Areas

RURAL Areas	Change of Per Capita Expenditure (1000 CFA)			
Intercept	38.63 (7.28)**	31.56 (41.52)	-11.81 (38.45)	-40.37 (3.85)**
Base Condition				
- Per capita expenditure (1000 CFA)	-0.42(3.6E-2)**	-0.52 (4.8E-2)**	-0.50 (0.04)**	
Human Capital				
- # of children in hh		-3.34 (1.82)*	-5.35 (1.82)**	
- # of male adults in hh		-10.05 (5.15)*	-12.82 (4.87)**	
- # of female adults in hh		-2.15 (3.95)	-6.12 (4.01)	
- # of elderly in hh		0.32 (6.25)	4.13 (5.85)	
- Age of head of hh		0.97 (1.44)	2.18 (1.26)*	
- Age of head of hh squared		-1.1E-2(1.4E-2)	-2.4E-2 (0.01)*	
- Ddiploma (yes=1)		-23.51 (16.69)	-11.43 (15.08)	
- Total years of education of hh members		1.55 (0.58)**	0.84 (0.58)	
Physical Capital				
- House ownership (no=1)		16.00 (14.18)	-4.42 (14.31)	
- Land used (hectares)		1.01 (0.76)	1.64 (0.88)*	
- # of farm equipments		6.07 (10.83)	18.10 (12.37)	
- Value of farm equipment (1000 CFA)		-5.9E-2 (9.4E-2)	-6.5E-2 (8.8E-2)	
- Non-farming business		-6.33 (14.00)	-17.03 (14.95)	
- Revenue of nonfarm business (1000 CFA)		-2.4E-3 (4.5E-3)	7.4E-3 (7.5E-3)	
- # of durable goods in hh		3.08 (3.21)	3.48 (2.97)	
- Value of durable goods in hh (1000 CFA)		4.3E-2(2.0E-2)**	4.3E-2 (2.7E-2)	
Region				
- East Forest (omitted)				
- West Forest		-17.26 (10.46)*	-16.98 (9.31)*	
- Savanahh		-6.60 (9.49)	-12.90 (8.65)	
Socio-Economic Status				
- Export crop farmer		11.03 (9.11)	14.56 (8.10)*	
- Food crop farmer (omitted)				
- Other		-6.11 (17.99)	-1.36 (16.08)	
Segmentation Variables				
- Non-Ivorian		10.57 (12.66)	10.96 (11.31)	
- Head's gender (female=1)		30.60 (14.57)	33.43 (13.34)*	
Income composition (%)				
- Share of wage income		0.20 (0.32)	0.51 (0.34)	
- Share of farm income		0.13 (0.24)	0.41 (0.25)*	
- Share of nonfarm income		0.32 (0.36)	0.74 (0.36)**	
- Share of other income (omitted)				
Change Variables between 1987 and 88				
- Change of # of children in hh			-19.96 (2.83)**	-20.94 (3.15)**
- Change of # of male adults in hh			-7.46 (6.60)	-4.59 (7.27)
- Change of # of female adults in hh			-20.73 (4.72)**	-21.29 (5.17)**
- Change of # of elderly in hh			-22.23 (9.33)**	-33.42 (10.79)**
- Change of total years of education			-0.59 (0.82)	-0.31 (0.92)
- Change of house ownership			51.12 (15.93)**	62.18 (16.89)**
- Change of land used (hectares)			0.92 (0.92)	0.97 (0.82)
- Change of # of farm equipments			28.36 (11.16)**	12.11 (9.66)
- Change of value of farm equipment(1000 CFA)			-2.6E-2 (7.7E-2)	3.5E-2 (7.9E-2)
- Change of # of nonfarm business			-9.04 (9.26)	-4.18 (9.10)
- Change of revenue of nonfarm bus (1000 CFA)			9.9E-3 (6.9E-3)	2.3E-3 (4.5E-3)
- Change of # of durable goods			5.31 (3.50)	8.2E-2 (4.14)
- Change of value of durable goods (1000 CFA)			3.1E-2 (1.4E-2)**	4.4E-2(1.1E-2)**
- Change of share of wage income			0.10 (0.30)	-0.21 (0.29)
- Change of share of farm income			0.73 (0.23)**	0.73 (0.22)**
- Change of share of nonfarm income			0.95 (0.31)**	1.00 (0.32)**
- Change of share of other income (omitted)				
Mean of dependent variable	-35.217	-35.217	-35.217	-35.217
# of cases	341	341	340	341
R^2 / adj-R^2	0.283/0.280	0.374 / 0.322	0.562 / 0.501	0.256 / 0.219
F value	133.489**	7.199**	9.112**	6.974**

Note: * Significant at 0.10 level. ** Significant at 0.05 level. Standard errors are in parentheses.

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